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AUTHOR Leithwood, K. A.; Russell, H. H.
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ABSTRACT

This speech presents a model for implementing educational change. The author conceptualizes seven temporally sequenced stages of educational change, including (1) agreement to begin; (2) establishment of an organization; (3) selection of problems and goals; (4) study of available solutions; (5) pilot trials; (6) adopt, adapt, reject decisions; and (7) field trial. Within each stage of change implementation, one or more change components must be present before implementation can proceed to the next stage. These components are features found to be critical to change and include (1) climate for change, (2) academic-practitioner interaction, (3) roles for evaluation, (4) program development strategies, (5) interschool cooperation, (6) countrywide communication networks, and (7) teacher responsibility for change. (Author/RA)

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PLANNED EDUCATIONAL CHANGE:

DEVELOPING AN OPERATIONAL MODEL

K. A. Leithwood and H. H. Russell

The Ontario Institute For Studies In Education

Trent Valley Centre

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I Introduction

Curriculum development has always been of central concern to educators. The freedom and accompanying responsibility implicit in the generality of recent Department of Education guidelines seems to make it an even more important issue to Ontario educators than it has been for some time.

The process of curriculum development involves massive investment of resources, and hence strategies which can be used to promote and facilitate the process bear notice. Few practicable strategies now appear to exist, in spite of the extensive literature about the topic. Evelyn Moore (1971), in an article entitled "The Way It Is In Curriculum Development," suggests that "--- there is little overlap between the literature of curriculum development and the reality of curriculum determination in the classroom (P.12)." Pillet (1971) identifies an ever widening gap between theory and practice brought on, to a great extent, by frequent disregard for the problems of transition to new ideas.

But theory and practice should be mutually supportive and curriculum development progress in the classroom can be facilitated, potentially, by theoretical constructs when such constructs arise in response to needs identified by practicing educators as significant features of their world.

This paper describes a county-based school change model which, the authors feel, has this potentially facilitating effect by virtue of its initiation as a model "of" change as it was and is occurring in a number of schools involved in a curriculum development project of considerable, demonstrable success, to date. However, the model presented here could be described as a model "for" change

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[1] Trent Valley Centre, R. R. # 3, Peterborough, Ontario

because some of its components which appear to have future importance in the context of program change have yet to be rigorously tested empirically. One of the major reasons for the gap between curriculum theory and practice and the lack of overlap between development literature and the reality of program change in schools has been the failure to view the curriculum development process as one component within a broader framework of school change. Such a framework is, necessarily, highly complex but,nevertheless, essential as perspective to judge and develop strategies for curriculum change.

This school change model consists of both components and stages. The components, 7 in number, are features found to be critical to change which appear in one or more of the stages of change. The stages are 7 temporally sequenced points on a continuum beginning with a decision to begin working toward change and ending at the stage of field trial, from which point recycling through some earlier stages is still likely to occur. The major components of the model include: (a) a climate for change; (b) academic - practitioner interaction; (c) roles for evaluation; (d) program development strategies; (e) interschool cooperation; (f) countywide communication networks; and (g) teacher responsibility for change. Stages in the model include: (a) agreement to begin; (b) establishment of an organization; (c) selection of problems and goals; (d) study of available solutions; (e) pilot trials; (f) adopt, adapt, reject decisions; (g) and field trial. The model may be thus conceptualized as a components X stages matrix (Figure 1) with a total of 49 potential cells some of which are obviously important, some empty and many the significance of which has yet to be determined.

Components / Stages	1. Climate for Change	2. Academic School Interaction	3. Roles for Evaluation	4. Curriculum Development Strategies	5. Inter-school Cooperation	6. Communication Network	7. Teacher Responsibility
1. Agree to Begin	11	12	13	14	15	16	17
2. Establish Organization	21	22	23	24	25	26	27
3. Select Problems, Goals	31	32	33	34	35	36	37
4. Study Available Solutions	41	42	43	44	45	46	47
5. Pilot Trials	51	52	53	54	55	56	57
6. Adopt Adapt Reject	61	62	63	64	65	66	67
7. Field Trials	71	72	73	74	75	76	77

Figure 1 - - - A matrix showing possible interactions of components and stages in a school change model.

II School Change Model - Components

Change

The climate for change is an elusive component to analyze primarily because of the variety of forms it takes in different school contexts and the consequent difficulty in identifying common underlying features. Classification of the type of change referred to and illustration of several situations where such a climate pervades probably yields the best possible understanding of this component.

Types of change have been classified by many authors (Maguire, 1970) using a variety of criteria, one of the most powerful being the relationship between a change agent and client system (Bennis, 1966). All of these classification systems, however, include a category labelled "planned change" and the variety of definitions offerred for such change suggests that it is congruent with the change being discussed here. Chin (Maguire, 1970) suggests that such change is ". . . a deliberate and collaborative process involving a change agent and client system that are brought together to solve a problem or to plan and attain an improved state of functioning in the client system by utilizing and applying valid knowledge P.11)." In the present model such a definition needs to be tempered by some of the characteristics of what Bennis describes as "technocratic change." This type of change relies on the client's (teacher's) definition of his problem, the agent's knowledge of strategies leading to solution and the collection and interpretation of data to facilitate and validate that solution. Such planned - technocratic change is endorsed as a systematic procedure for efficiently carrying out rationally preconceived alterations in the educational enterprise.

Because such alterations in the curriculum area, as well as many other areas, are continuous, the roles of the client and agent, in this model, are not clearly distinct. The client must be given the opportunity, in his initial encounters with the agent, to acquire enough of the agent's motivations and skills so that agent and client are eventually dual roles played largely by the same personnel with decreasing external inputs. Such welding of client-agent roles into the person of the educational practitioner is designed to overcome two serious criticisms levelled by Herzog (Maguire, 1970) at typical approaches to the concept of planned change. These criticisms include (a) viewing schools as objects to be manipulated and (b) failure to recognize that most people are engaged in activities because they see value in those activities not because they are resistant to change. A third criticism - that planned change is too often naively profession-centred - is compensated for by systematic involvement of the community in school goal specification.

While the type of change (planned-technocratic) has now been established, it is still not clear what the term "climate for change" really means. Planned-technocratic change implies a process of conscious, systematic and scientific response to rationally identified educational needs or goals. Such a process requires large resource allocations on the part of those involved and, hence, a clear understanding and substantial commitment to the need for change on the part of practitioners engaged in planning the change. The climate for change is the behaviorally represented indicators of such understanding and commitment. Such a climate seems to exist (a) when teachers wish to meet with parent groups to cooperatively engage in school goal setting, (b) when teachers meeting as a group openly

discuss their real problems and cooperatively plan toward solutions, (c) when a principal is willing to assume a facilitative rather than directive role with teachers, (d) when a school staff desires to rearrange timetables to free blocks of cooperative planning time, (e) when a teacher feels secure enough to oppose, on rational grounds, changes suggested by the principal. All of these indicators of what is meant by a climate for change are found in the schools in which the change model is developing and many more could be cited. Suffice it to state that the climate for change is a pre-condition to planned change or even planning for change, and without it subsequent actions would probably be largely ineffective. It is, in fact, the failure to establish such a general climate for change that has doomed many curriculum development projects to failure before they have begun.

The ways in which a climate for change is established vary greatly across schools but in most instances the principal is responsible for its initiation. Several appendums to this statement should be noted immediately. First, while the principal is a centre of communication (see page 25), the teacher has ultimate responsibility for effecting classroom change (see page 23) and hence the initiation of change by the principal must be as a stimulant to the teacher's assumption of responsibility for change. Such initiation cannot be forced nor should it reduce the teacher's important decision-making responsibilities, but only make clearer how the principal can be used to facilitate the changes envisioned by the teacher. Most important, the teacher must be made aware that his actions are endorsed and supported by the principal. Second, it would be misleading to suggest that the methods used by principals in the project so far, to initiate change, have much or any generalizability

beyond the schools in which they were used. Principals who encountered difficulty in stimulating their staffs to assume responsibility for change when the project began are, almost to a man, still having a great deal of trouble, in spite of the benefit of consultation with fellow project principals having more success in this regard. The establishment of a climate for change is a highly complex endeavour involving an optimum mixture of principal support, staff readiness, group dynamics, problem visibility, community characteristics and a host of other, less readily identified variables. When the right mixture exists, a possibly erroneous issue such as low standardized test scores in mathematics can be sufficient to elicit a commitment to change which will carry those involved through the labour of all 7 of the model's stages of change.

Academic-practitioner interaction.

Associations between the practical world of the schools and the more abstract world of academia have not been productive, historically. The number of solutions generated by educational researchers to problems of concern to practitioners is woefully small. Several reasons for this state are readily evident. Educational researchers are too often engaged in finding solutions to problems identified by themselves and irrelevant to school people. No matter how significant the solutions thus generated their impact will be minimized by the lack of need for such solution. Research activities, to be productive in school contexts must be organized around issues considered critical by practitioners. This means (a) creating 2 way communication links between the researcher and practitioner and (b) utilization of expert manpower to solve the emerging issues even if that means engaging

researchers in projects which are not of natural concern to them. The idea of the researcher, using his scientific skills in pursuit of knowledge vital to the interest of others and not necessarily himself is largely foreign and probably distasteful to many educational researchers. What is being suggested is the adoption of a model for client-agent interaction which more nearly approximates the industrial rather than the university model with its record of brilliant yet often disjointed and ineffectual achievement. Perhaps the best of both worlds is possible with the proper matching of a large pool of expert manpower resources with problems judged relevant by external, school sources. Such a potential exists at OISE but has yet to be exploited nearly as fully as it could be.

Even when academics have dealt with school relevant problems, the strategies for operationalizing change, as often as not, have been impotent. Responsibility for this condition rests evenly with academics and practitioners. Academics have typically adopted disfunctional tactics characterized by a large proportion of discussion of problems and solutions at a general level and a very small proportion of expended effort in the task of change implementation. It is erroneous to suggest that the generation of solutions and their implementation are separate activities. In fact, only through the labour of attempted implementation does a solution acquire the richness to qualify it as worthy of thinking about. Part of this situation must be attributed to the implied wishes of practitioners, however. An invitation issued to an academic "expert" to speak at a professional development day on some related occasion is one of the best possible ways of confusing an issue and building in a resistance to

change on the part of a majority of those who attend such an occasion. Change will only occur when an organization is established to facilitate communication on a continuing basis. If inspirational speeches were adequate, every school would be a model of planned change since all staffs have been subjected to such inspiration many times. Such a strategy, therefore, may serve to give the appearance of change activity but avoid the potential trauma associated with the substance of change.

Evaluation

Scriven (1967) has distinguished between goals and roles for evaluation. Although there is some disagreement (Stake, 1967) the goal for evaluation in this model is singular, as Scriven suggests, that being to judge the merit or worth of an educational variable. The most controversial issue here, in fact, is not whether there are other goals for evaluation but who will be the judge. Consistent with the concept of planned-technocratic change, discussed above, in which there is gradual welding of client-agent roles, the judge in this model is the client-practitioner. The initial change agent assumes consultative responsibilities with regard to data analysis, interpretation and research design, where they are important, but the adopt, adapt or reject decisions are exclusively in the domain of the practitioner who must ultimately implement the decision and be held accountable for its consequences.

The roles of evaluation are many including prediction, selection, national assessment, diagnosis, curriculum assessment and many others. These various roles have been classified as either formative or summative depending on the uses made of the resulting data (Scriven, 1967). Summative evaluation

provides information, to a potential adopter of an educational process or product, designed to enable him to determine the relative costs, advantages and disadvantages of adoption prior to making a commitment. When packaged programs are selected by schools, this is the use evaluative data is put to. Formative evaluation, on the other hand, proposes to supply information to the developer to assist in the further refinement of process or product. As a result, formative data may often have to be very detailed and particularly multi-dimensional in order to be useful. Furthermore, it must be available when it will be useful to the developer. Where the teacher is also curriculum developer data from the previous year's program must be available before beginning the new year's program and data from each segment of the program must be available as the subsequent application of the program segment is planned.

Within this formative role, although not exclusively, evaluation serves 3 distinct functions in the change process. These three functions are the promotion, facilitation and validation of change. Evaluation data often functions to promote change by stimulating attention to problems with the status quo and providing a basis for making decisions about program adequacy with regard to current educational objectives. A decision to evaluate present curricula also leads through a process of goal clarification and refinement which virtually guarantees that the program finally evaluated will not be the original program. This is one of the effects of experimenter intervention that is to be avoided at all costs in controlled research, but on the other hand it is to be greatly encouraged in the process of planned educational change. Evaluation has thus begun to facilitate change and can

do so further by enabling developers to identify program objectives being achieved least well, as a focus for the initiation of systematic curriculum development. Such identification of initial focus has the advantages of:

(a) diagnosing weaknesses teachers may be able to improve on immediately in the classroom;

(b) scaling down the size of the curriculum development task by avoiding work on objectives already being well achieved.

Both of these features are especially attractive when teachers are also developers since they are likely to feel the press of daily classroom needs and have only enough time to work on the most urgent curriculum problems.

The third function of evaluation in change, that of validation, speaks directly to much of the available change literature which appears to imply that change is to be valued in its own right without regard to the consequences of that change. This model diverges most severely with the literature in taking considerable pains to assess the effectiveness of change and in providing opportunities to adapt or reject ineffective changes. Many dimensions of innovative products chosen for or developed in the project have been assessed to date including student, teacher, teacher aide and parent attitudes, description of treatments, student performance and the relationship of student performance with baseline descriptons including IQ, socioeconomic status and standardized achievement scores. Particular attention has been paid to student performance data on the rationale that an innovation to be worthwhile must result in greater, different or less costly student achievement, than the previous program to merit retention. (An unlikely but possible exception to this would be an innovation which had

a positive effect on attitudes and produced the same amount and type of student performance as the previous program at the same cost.)

The assessment of student performance has moved the focus of measurement within the model away from classical measurement techniques into criterion-referenced measurement. This shift has taken place not because of a profound disagreement with classical measurement methods but because of a difference of purpose. Classical measurement methods are designed largely for selection and prediction. Because of this, test development procedures tend toward making such instruments unidimensional and scores of students, on such tests, norm-referenced. Assessments, using such techniques, indicate where a testee stands in relation to other testees with respect to some identified measure or some clearly prescribed summation of measures. However, the threefold purposes of evaluation in this model require information of a very different sort, based on a different set of assumptions. These assumptions are that the abilities being measured may be heterogeneous, containing many component abilities each in need of separate assessment. This appears to be the case in practice where the dual purposes of formative evaluation as used in the model include diagnosis and curriculum evaluation. In both cases, achievement of specific educational objectives is the information being sought and selection and prediction decisions do not enter. It should be pointed out, however, that the same pool of test items may serve both classical and criterion-referenced measurement purposes. The differences in purpose will dictate differences in item selection from the common pool to serve either criterion or norm-referenced instruments.

Process evaluation is considered to be as important as product evaluation but it is more difficult to develop an appropriate methodology for it. Several promising plans have recently been initiated in cooperation with OISE sociologists Michael Fullan and Glenn Eastabrook. These plans involve initial data collection of school characteristics and modes of operation related to innovativeness. Subsequent intervention programs will be undertaken, when project schools desire it, to alter, where possible, characteristics which detract from optimum change activity. To date, the collective processes imbedded in this change model appear to be reasonably effective, but the process evaluation of the next two years will be necessary to identify specific strengths and weaknesses of these processes.

The Choice of Design. Student achievement in the project curricula have been, or will be in the near future, assessed employing one or more of three experimental designs. Using Campbell and Stanley's (1963) terminology these designs include (A) the "one-group pretest-posttest" pre-experimental design, (B) the "nonequivalent control group" quasi-experimental design and (C) an extremely useful adaptation of the pre-experimental "static group comparison."

This year the "one group pretest-posttest" pre-experimental design was used to evaluate student achievement in all of the project components. This design yields information limited by a number of extraneous variables that can jeopardize internal validity. In this project those variables include history, maturation and the effects of testing. The effects of history and maturation will be greatest in the case of 2 packaged programs since a greater time elapsed between pre and posttesting. Results from teacher-built

programs, because of shorter elapsed time are less influenced by history and maturation but more affected by the tendency of students to do better on the second administration of a test or alternate form of that test. Most of these extraneous variables have an inflationary influence on the true difference scores necessitating a need for conservatism in the interpretation of results. Nevertheless, as already discussed, because 2 teacher-built curricula are in the formative stages of development, the inadequacies of this design are to be preferred to a more rigorous design which might have discouraged further program development - the promotion of which is a major role for evaluation in this context. While inadequate resources are the major reason for employing this design with 2 highly developed packaged curricula, similar benefits are, nevertheless, available. These have to do with the freedom teachers are given, in a non-comparative setting to develop not the already fixed program components but the necessarily school specific techniques required to make the program optimully successful. Further, the pressure of implementing a new curriculum in the first year could, under some circumstances, be added to by the knowledge of comparison.

The quasi-experimental "nonequivalent control group" design was used with pre and posttesting in one instance this year and its use will be expanded next year to include 4 programs thus far evaluated. Socioeconomic status (as well as school size) was heavily relied on as a similarity criterion because of both its potency in relation to achievement variables (Ireton, 1970) and the availability of such data without large resource expenditures. Depending, to some extent, upon the equivalence of groups on

pretest scores this design controls the main threats to internal validity of history, maturation, testing and instrumentation since these factors should influence both control and experimental groups similarly. Regression effects are not likely to occur since there is no need to be concerned with extreme groups.

An adaptation of the "static group comparison" design has been made which makes the design inexpensive, convenient and practical to employ as well as yielding unusually dependable comparative data for evaluation purposes. Typically, this design compares the posttest results of a group which has experienced a treatment with one which has not for the purpose of establishing the effect of the treatment. The weaknesses in the design as stated are readily evident, the major one being the lack of means of determining initial group equivalence. The groups might have differed even if the treatment had not been given to one of them. Campbell and Stanley (1963) point out, as well, that efforts to match groups on selected background characteristics are usually ineffective and misleading. The method of grouping subjects, then, is the major flaw in this design and when it is overcome with randomization the design assumes the stature of a true experimental design.

Several evaluation studies in the project which will be reported next year have employed a compromise between these pre and true-experimental designs by the method of assigning subjects to groups. The limitations of matching are well known but can be in great part reduced by choosing a comparison group from an identical setting. Thus, comparison subjects for some programs being evaluated next year will be the pupils in the same grade,

same school with the same teacher the prior year. For example, an innovative kindergarten program being introduced in September 1971 is to be evaluated with this design, so in September the grade 1 children (last year's kindergarten class) were posttested and these results compared with the results of the class taking the innovative program next June or September, for differential treatment effects. The assumption of pretest group equivalence cannot be accepted as readily as would be the case had comparison and control subjects been assigned to groups randomly. Yet history is virtually the only confounding variable to a perfect group march given the relatively stable population from which the subjects are drawn. In many cases the children will even have the same parents. Certainly, SES, IQ, motivation, teacher effects, school environment and community environment will be common to both control and treatment groups qualifying this design to be classified, in the opinion of the writers, as quasi-experimental.

This design has a number of other advantages to development work, the major one being its economy. Comparison groups are always difficult to find and non-innovating schools are understandably reluctant to participate in studies for which they perceive little payoff to them. Using this design, both control and treatment groups can be drawn from the innovating school. In order to do this using randomization techniques, half of the target population would have to forgo the innovative treatment in order to serve as comparisons or the treatment could only be offerred to half of the target population for the first half of the year and the remainder of the target population in the second half of the year. This would necessitate innovating a program covering only half of the school year. None of these requisites for randomization are convenient for school people and none are necessary with

the design modification suggested.

Several other issues related to the operationalizing of experimental evaluation design are appropriately dealt with here. The first concerns procedures for data collection, specifically the collection of criterion-referenced[1] data. As discussed more fully on pages 9 to 13, collection of such data ideally include comprehensive assessment of student achievement of all program objectives, resulting in many test items. In most school settings the amount of time required to test all students on all items becomes prohivitive. Two solutions to this problem are most readily apparent and both have been tried in the Project. One is to incorporate the testing into the ongoing program using the items for teacher-diagnostic as well as overall evaluative purposes. This option has the advantage of providing immediate feedback to the teacher and is difficult to surpass as a formative evaluation strategy when the teacher is also the curriculum developer. The disadvantages, however, include inconsistent testing procedures since there are many testers, as well as placing the responsibility for carrying out the testing schedule largely on the shoulders of teachers. When the data are to be used for summative purposes, experience in the Project indicates that, in spite of relatively open communication channels, the necessity of carrying out the testing schedule and procedures exactly as planned may not be fully understood. This severely jeopardizes the reliability of data to be used for summative purposes, especially.

A more satisfactory compromise now seems to be the provision of

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[1] See pages 12 to 13.

diagnostic test items for use in the formative mode as well as a formal testing program carried out by R and D personnel. In order to undertake the latter, techniques have to be found to both dramatically reduce testing time while at the same time assessing most measurable program objectives. One method of doing this, that appears to be satisfactory, is to randomly divide the total item pool into a number of sub-tests, each requiring about the same period of time to complete, and then randomly assigning sub-tests to students within a given class. This strategy results in a mean score for each item, for each class, rather than a score for each student. Such a result is particularly attuned to the purposes of criterion-referenced measurement since the adequacy of the program in achieving each of its objectives then, necessarily, becomes the focus of evaluation rather than the student.

Frequently criterion-referenced measures consist of large numbers of performance items which place heavy demands on the time of the evaluator if formal testing procedures are to be carried out. In the project the time of testers has been severely limited resulting in a search for adequate methods of expanding evaluation without a reduction in the quality of the data. In one program now under evaluation (to be reported next year) a highly selected group of volunteer parents were trained in the administration of individual performance test items in science. From the R and D evaluation point of view, the data they collected were highly reliable due to the extensive training and monitoring of testing procedures. In fact, because parents were chosen who had children the same age as the subjects being tested, the rapport of tester and testee often surpassed the rapport a professional tester would be capable of establishing. From the point of view

of the principal implementing the program that was being evaluated, the use of parents as testers had several added positive features. The parents, having become thoroughly familiar with the school operation, in general, and the new program, in particular, acted as goodwill ambassadors to the community for the school. Exposure to the school under structured conditions also added considerable impetus to this volunteer parent program.

Curriculum Development Strategies

In spite of the importance of processes for change, the criterion against which they must be judged is the outcome or product of those processes. It would be difficult, however, to defend an absolute distinction between process and product since a product like "student achievement," as it can be measured, is only a static and, therefore, artificial record of continuous learning and performance. An operational distinction can be made, however, where classroom treatments are defined as products, activities preparatory to such treatments are processes and student achievement is the outcome criterion against which product and process are judged. When the product is defined as classroom treatment, the limitations of both product and process evaluation become immediately evident. Such evaluation, concerned with student achievement, is an assessment of unique, non-repeatable treatments when those treatments are each considered as a unit. There are critical components of those units that are repeatable, however, and the curriculum development processes or strategies in this model focus on these repeatable components. The strategies employed in program development in this model include four dimensions (Figure 2), these being the identification of educational objectives, the gathering or generation of materials to be used in achieving

those objectives, the choice of instructional techniques for manipulating those materials, in an effective manner, and evaluation of the achievement of objectives, materials and techniques.

The sorts of formative and summative evaluation required and the

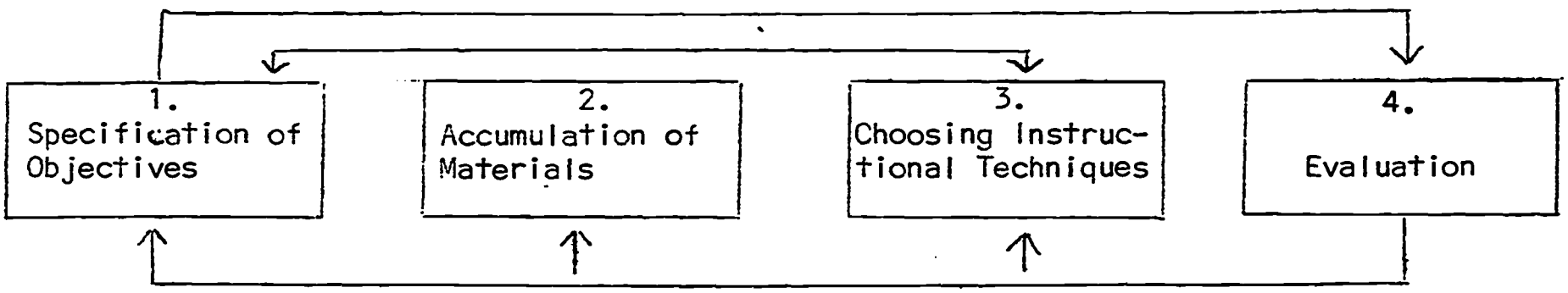

Figure 2 - - - Components within curriculum development strategy.

selection strategies exercised on materials and techniques necessitates the specification of objectives to be in operational, behavioural or student performance terms. While many arguments have been raised against such specification, most are patently invalid (Leithwood, Russell, in press, Popham, 1970). The position being forwarded really is no more complex than indicating ones purposes so that one can determine how to go about achieving those purposes and assess when or if those purposes are achieved.

The order in which the components appear in the curriculum development process vary greatly with the needs and characteristics of the developers. In a great many instances the shortest route to total curriculum development task "completion" (the task is really never done) may begin with the evaluation or materials components. Beginning with selection of materials is useful since it leads to innovations in the classroom very quickly and generates the need to move concretely to issues of objectives

as a basis for decision-making about selection of materials. Beginning with evaluation has the advantage of diagnosing areas of greatest present weakness and treating those areas of greatest need first. It necessarily involves beginning where one is at present and moving from there - - a very sound policy, in most instances, and related to the problem of transition to new ideas raised by Pillet (1971) earlier. Beginning with the objectives component is logically appropriate but objectives specification can be a long and difficult task requiring considerable patience before the impact of such work becomes visible in the classroom. One of the most promising ways of reducing the size of this task is through the use of objectives pools like the Instructional Objectives Exchange (Popham, 1971) or, even better, objectives and items pools (Horn and Russell, 1971; Leithwood and Russell, 1971). Such pools enable teachers to select student performance objectives, which they feel are appropriate for their curricula, without the need of writing such objectives. When the objectives have accompanying items, 2 of the 4 components of curriculum development, objectives specification and evaluation, are greatly facilitated. The curriculum developer's major concerns can then be focused on objectives selection and the materials and techniques components of curriculum development. It might also be possible for materials developers to relate closely to such pools and help create teacher resource centres where, not only objectives and test items, but associated materials were catalogued (Leithwood, 1971). This is not to suggest that the same materials cannot be used to achieve many objectives but some are obviously inappropriate and a few extremely useful for instructional purposes related to a specific educational objective.

The arrows in Figure 2 indicate that curriculum development can begin with any component and move in a number of directions. It is not possible, however, to arrive at the evaluation component without going through the specification of objectives first. Having arrived at evaluation, however, the resultant data potentially feedback into all 4 components for further revision and refinement. Suppose, for example, that the results of evaluation indicate no student performance gain on a given objective after exposure to the curriculum treatment. Fifteen possibilities potentially are available to account for such lack of program ineffectiveness. These refer to decisions about each of the components in Figure 2 considered separately as well as all possible combinations of such components including:

1. The objective was inappropriate, unachievable or otherwise poorly selected for the program and requires revision or elimination;
2. The program materials designed to achieve that objective are ineffective and require revision or change;
3. Instructional techniques need review;
4. Items used to measure objectives achievement are invalid;
5. to 10. Problems with double combinations of components including 1 and 2, 1 and 3, 1 and 4, 2 and 4, 3 and 4;
11. to 14. Problems with triple combinations of components including 1, 2 and 3, 1, 2 and 4, 1, 3 and 4, 2, 3 and 4;
15. Problems with all 4 components of the curriculum development process.

Because each of the 4 components requires its own set of skills to carry out adequate development and because of the large number of possible

decision points (15) requiring data of some sort, 2 conslusions seem notable here. First, the complexity of the curriculum development process, considered without reference to a larger framework of school change, has been grossly underestimated. Second, the availability of multi-dimensional evaluation data is vital. Both of these conclusions seem, on the surface, to suggest that asking the busy teacher to be a part of curriculum development is very unrealistic. On the contrary, however, expecting anyone but the teacher-developer to have access to the range of primary, secondary, objective and subjective, sometimes impressionistic, informally gathered data necessary to cope with the 15 decision points outlined is even more unrealistic. The task is simply beyond the scope, resources and technology of the professional curriculum developer and evaluator. What seems to be most realistic is substantial support for the teacher in this role both through extensive in-service training in a meaningful context and facilitative and consultative personnel and agencies prepared to act on needs identified by the teacher.

Teacher Responsibility

The rationale for primary teacher involvement in curriculum development and school change, generally, has been foreshadowed in the previous discussion of curriculum development and welding the roles of the change agent and client into the person of the client. The need for such responsibility was recognized by John Dewey (1966) many years ago and identification of the school as the critical educational unit was recognized by A. N. Whitehead (1956). Both philosophers knew that if educational objectives are to be implemented in classrooms they had better be the schools own objectives. When this is not the case and objectives

are imposed on the teacher, a conflict typically arises between dormant explicit objectives and very active implicit objectives with implicit objectives winning "hands down." This consequent suppression of operational classroom objectives can only be detrimental to systematic curriculum development, communication and student achievement.

Teacher responsibility for curriculum, however, does not imply that superintendents, subject-matter specialists, consultants and trained curriculum developers cannot lighten the teachers' load greatly without violating the principle of teacher responsibility. What is suggested is that teachers should be encouraged to identify the needs they see in their classrooms, specify (at some level) the objectives they have for their students, feed other persons when necessary with information to guide the development of materials and strategies that will help meet those identified needs and critically evaluate materials and strategies in light of their objectives. It should be the teachers' prerogative to make the final adopt, adapt of reject decision (within the financial limitations imposed on administration) because it is the teacher who is ultimately held accountable for the performance of the students subjected to the curriculum.

Communication networks and inter-school cooperation.

Two networks for communication have been elaborated in the model. The first is a communication network which relates educational personnel by constituent position to one another where the school principal is the hub of communication with respect to change and innovation. The central role of the

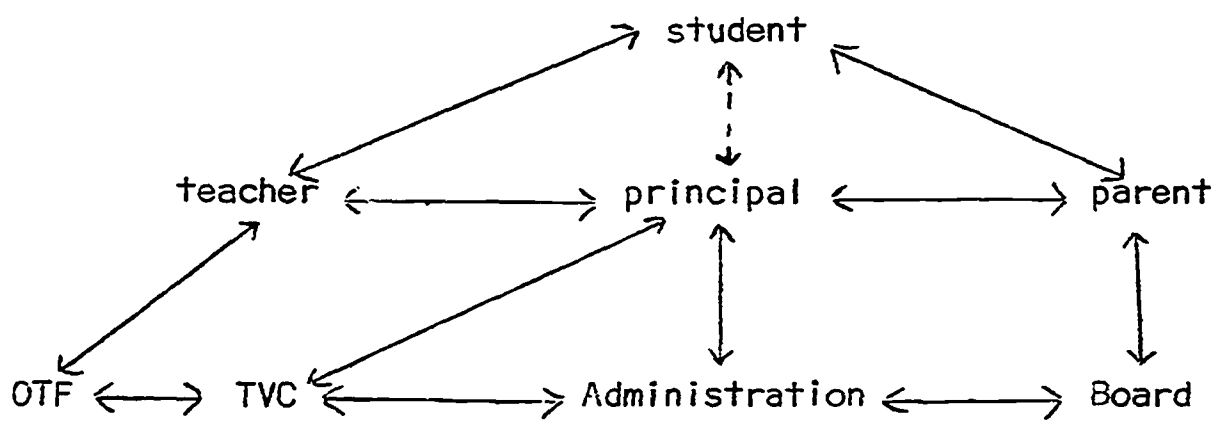

Figure 3 - - - The central position of the principal in educational communication

principal in this network highlights his function as change agent having direct communication access to senior administration, teachers, students, parents and outside agencies, although no direct contact with elected trustees in most cases. He is, therefore, in a position to initiate and facilitate change in his school and the school, as already suggested, is the primary educational unit.

The second communication network functions as a mechanism through which the principal and sometimes staff representatives performs many of their facilitating activities. This network links school principals formally involved in the innovative process through cooperative groupings of various sizes depending upon purpose. Those types of groupings are imbedded in this network. The first of these is labelled a "joint" group and consists of all innovative school principals in a county who wish to

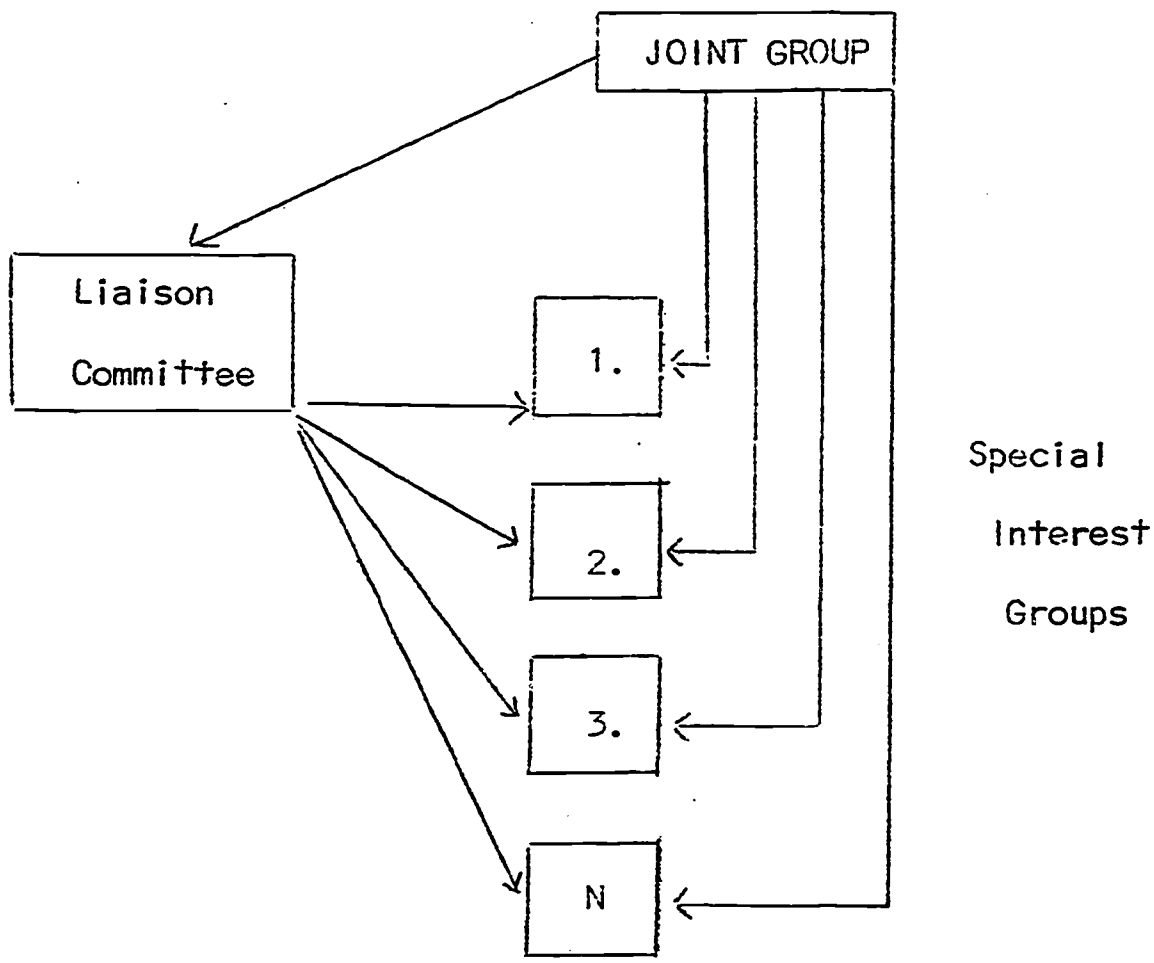

Figure 4 - - - A school interaction network to facilitate cooperative change.

be a part of the change model. This group's function is to provide (a) a forum for general issues of common concern and (b) simple information relay. A second group, the "liaison" group coordinates and facilitates the project work of the participating schools. More sub-groups are designed to deal with specific, substantive curriculum and other change issues. The group structure provides (a) the benefit of mutual experience (b) the dissemination of useful information (c) mutual support and (d) an efficientmeans whereby consultative assistance (e.g. Trent Valley Centre) can be mustered to deal with important problems of common concern. Furthermore, new schools wishing to join the project may do so at a relatively concrete level through a special interest group, although joining the project does carry with it the

responsibility of studying change processes more generally. These new schools may be considered a special interest group focused on change and representatives from the liaison committee play a consultative role in that group. The groups last only as long as it takes to solve the specific problem they were created to work on.

Some of the advantages of this organizational network are better appreciated when viewed in a broader perspective. An interesting paper by E. G. Bogue (1971) entitled "Disposable Organizations" provides such a perspective. Bogue contends that traditional organizational structures are often not capable of providing the fast acting response needed to deal effectively with contemporary change. Bureaucracies, with hierarchical systems, favour the status quo and contribute to inertia by reducing opportunity for change. One solution to this problem is organizational decentralization but county reorganization in Ontario education was a move in quite the opposite direction. The special interest groups in the network outlined above are what Toffler (Bogue, 1971) calls "throw away" organizations. Such organizations are (a) problem or issue centred rather than function centred; (b) temporary with a built in self-destruct mechanism activated upon problem resolution; (c) staffed so that authority of competence replaces the authority of position and role. This provides opportunity to utilize diverse specialists in a common venture; (d) able to short-circuit channels of communication rather than follow vertically structured paths.

Bogue cautions, however, that "most persons need a degree of stability along with the challenge of change." Certainly the network being discussed has a relatively stable, although flexible Joint Group and the entire network operates

cooperatively rather than competitively within the more familiar educational administrative structure. There seems to be good reason, theoretically, therefore, for such a structure to be effective in facilitating change.

III School Change Model - Stages

While the components of this model, as they have been discussed, are important to consider in isolation, many (although certainly not all) of their features are already well known and, indeed, have been part of educational knowledge for many years. The major contribution to new knowledge that this model makes has to do with the ways in which the components interact in a dynamic way to produce validated educational change. Educational literature abounds with treatise on objectives, evaluation and communication. The school as the educational unit and teacher responsibility for goal setting were recognized many years ago by Dewey (1966). Few attempts have been made to "put it all together," however, in a way that gives each component context within a larger framework or strategy that will eventuate in the kind of change that has been discussed in this book. That framework was what dictated the differences in approach that were sometimes evident in the model's components as they were discussed separately.

Figure 1 illustrates how the components of this model interact, as conceptualized to date, through seven temporally sequenced stages from initial agreement to change to the stage of field trials of new programs. The latter 2 stages are as yet not clearly defined and they represent a focus of research for the next 2 years. It should also be noted that some of the elements and orders within each of the other stages will undoubtedly alter as work progresses to refine the model. It began, in fact, as a "model of" change and refinement is in the direction of making it a "model for" change. In the remainder of this chapter the stage-based

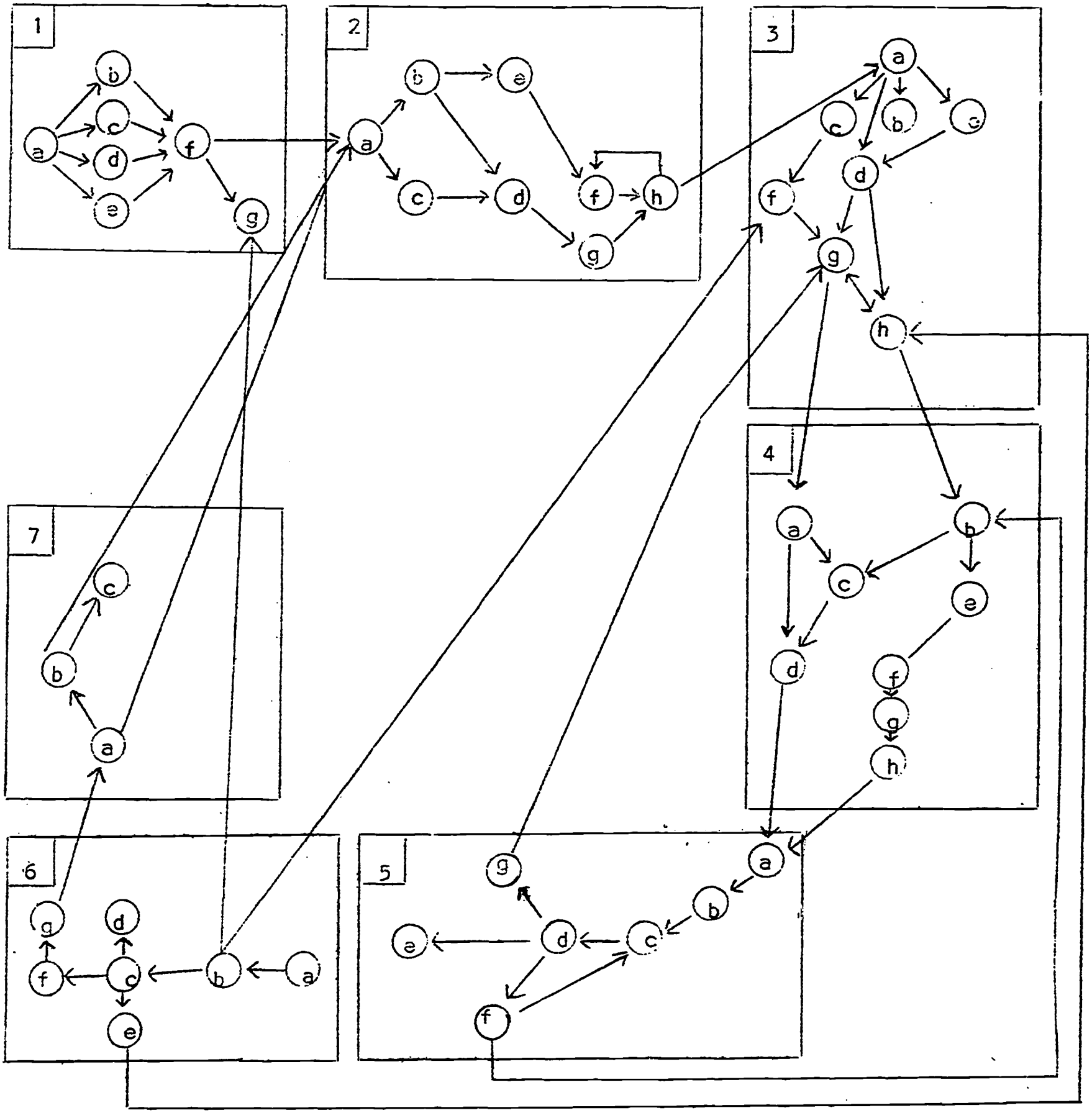

Figure 5 - - - Stages leading to school change

Key to Figure 5

1. Agreement to begin

   (a) Meeting of representatives
   (b) Meeting of pr & T representatives
   (c) Meeting of R & D
   (d) Meeting of consultants
   (e) Meeting of other manpower groups
   (f) Specific agreement to proceed
   (g) Plan advisory committee

2. Establish organization

   (a) Select schools
   (b) School level meetings, T, pr, +
   (c) Meeting of pr, adm, R & D, consult.
   (d) Pr study change process
   (e) Select T within schools
   (f) T study change process within school during released time
   (g) Pr plans use of expert & volunteer manpower
   (h) T make go or no go decision

* P+ - parents
* Pr - principal
* R & D - Research & Development
* T - teacher
* St - student
* Adm - administration

3. Select problems and goals

(a) T study general school goals
(b) Pr acts as facilitator
(c) Pr study behavioural goal specification
(d) T study behavioural goal specification
(e) School community interacts on gen goals
(f) Pr study available solutions (consultants)
(g) T study available solutions (consultants)
(h) T generate or select instr. goals

4. Study available solutions

(a) T select inn. prog.
(b) T decide to dev. inn. prog.
(c) Pr seek authority to proceed
(d) T training + study
(e) T study materials available
(f) T select materials & organize
(g) T develop or select instructional objective
(h) T prepare auxiliary material

5. Pilot trial

(a) Design pilot trial (time sequence)
(b) Pre-test
(c) Begin trials
(d) Formative eval.
(e) Adopt decision
(f) Adapt — Module
(g) Reject

6. Adopt, adapt or reject

   (a) Recycle prog. within school
   (b) Report eval. data for prog.
   (c) Adopt
   (d) Reject
   (e) Adapt
   (f) Report summative eval. data
   (g) Plan field trial

7. Field trial

   (a) Design for eval.
   (b) Design for diffusion
   (c) Plan eval. of diffusion model

component interactions will be discussed, although briefly, since each has been mentioned already in the context of the case study report.

Stage 1: Agreements to Begin

This stage begins with a decision at the county level on the part of some group of practitioners (a) that their schools could be better and that they are prepared to investigate how such improvement could be pursued. Having made this decision, the agreement to begin in a formal manner (f) necessitates gaining the cooperation of all effected groups including principals, teachers, administrators, consultants and R and D persons who may be able to facilitate the desired change. This gaining of cooperation is the purpose of meetings (b), (c), (d) and (e). The result of these meetings and formal agreement to begin is the planning of an advisory committee (g) which has a broad educational community base and is designed as a sounding board on which the innovators can test their ends and means before and during operationalization of these means and ends. Basic to decisions made at this stage are the concepts of teacher responsibility and the school as the critical educational unit. Five principals working toward their M.Ed. degrees were the original initiators of change in the project from which the model is derived.

Stage 2: Establish Organization

The establishment of an organization for change begins with (a) a selection of schools. Two of the most important issues here are who does the selection and what are the selection criteria. Usually, the preferred situation involves school self-selection on the basis of evinced interest in change. When this is the case the process moves directly to school level meetings (b) with and among teachers, principals and whoever else the school unit feels would be helpful - possibly R and D personnel and/or

consultants. From this point two routes are possible leading to the teachers' study of the change process in released time (f). One of these routes involves the principal studying the change process first (d) as a means of determining techniques for initiating an interest in his teachers. This route would be followed when there was no strong initial pressure from the teaching body to change. In such an instance part of this study might lead him to plan for the use of expert and volunteer manpower (g) as a way of stimulating interest. An alternate route, appropriate when the principal is ready to change and knows teachers are also ready is to select the teachers who will begin (e) and initiate their study of the change process perhaps in cooperation with him. Teacher selection again is a critical issue and self-selection is vital where possible. The task of change is a massive one, however, and for an entire, larger, staff to be involved simultaneously at the outset would present problems which might be insurmountable.

Where self-selection does not occur the route from (a) to (d) involved (a) meeting(s) of principals, administrators and R and D consultants (c) in order to facilitate selection. The gathering of sociometric data has been contemplated (but thus far not employed) for assisting in such selection. Two points need to be made clear here. First, the reaching of the "go or no-go" decision point with regard to change after a study of process is most fundamentally the reaching of a point where the teachers decision takes priority. Second, there are 2 possible routes if the "no go" decision is made. One of these routes is back to further study of the change process. The second route is to drop out of involvement in change at all, a difficult or impossible thing to do.

Stage 3: Problem and Goal Selection

The decision to proceed with change leads to a study of general school goals on the part of the teacher at a high level of generality initially but at increasingly specific levels as study proceeds. The end result of this stage is either the generation and/or selection of specific program goals by the teachers or the selection of programs that speak to general teacher goals. In order to reach this stage, teachers must, and principals probably should, be involved in studying the technology of goal statements in student performance terms and studying available programs that potentially achieve these teacher-generated objectives. The school community might also be involved, as it has been in the project, at a general level, in order to ensure that the broad school goals reflected the goals of its most relevant society. Depending on whether or not a ready-made program can be found or a new teacher-generated program is to be developed, two routes into stage 4 seem possible.

Stage 4: Study Available Solutions

The route from stage 3 (g) is to stage 4 (a), the selection of the innovative program and this route can be a reasonably swift one involving principal search for authority to proceed and then teacher training and study of the program leading directly to a pilot trial at stage 5. If the innovators enter stage 4 at point (b) they must examine available materials, select appropriate parts of them, organize these parts and write auxiliary materials (e), (f) and (h). They must also design the instructional techniques to be used with these materials (g). They then are able to move into stage 5 at the same level apparently as those

who chose the other route. This equality of stages may be misleading, however, since those who take the route (b) to (h) may need to recycle through stage 4 several times. If pre-selection criteria were adequate this is less likely for those who chose the (a) to (d) route.

Stage 5: Pilot Trial

At this stage, the design of pilot trials using an appropriate evaluation design, pre-test, trial initiation and the gathering of formative evaluation data are common steps but alternate routes become available after this point. The decision as to route is based on results of the formative evaluation and the possible routes involve program adoption, adaption or rejection. If the data suggest adoption (e) the route is directly into stage 6. An adaption decision (f) may suggest recycling as little as simply beginning another trial with minor alterations or as much as beginning back in stage 4. The rejection decision takes the innovator back to program or goal selection in stage 3.

Stage 6: Adopt, Adapt or Reject

A decision to adopt at stage 5 leads to stage 6 recycling of the innovative program within the innovative school (a) and the gathering of additional evaluation data. On the basis of this data adopt, adapt or reject decisions are once again possible. An adopt decision leads to reporting to other interested schools the results of evaluation and such data then are considered to be used in the summative mode. This report of data may lead to plans for program field trials in other schools who would be at point (f) in stage 3. An adapt decision, depending on the size of required adaption, may lead back to any point in stage 4 and even back to (h)

in stage 3 if problems are very fundamental. A reject decision might lead out of the change process.

Stage 7: Field Trial

The steps in stage 7 are not clear at this time and probably will not be until project programs reach this stage - a stage only one program is now entering. It appears, however, that designs for evaluation and diffusion are integral parts of this stage as is a carefully planned evaluation of this diffusion model.

IV Conclusion

Subsequent refinement and further evaluation of this model for school change will depend on two types of related activities. One of these activities is trial of the model in a number of areas outside of the county in which the original project was undertaken. Other areas most likely to try the model in the near future are counties within the educational region of responsibility to the Trent Valley Centre. There may be a number of possible alternate plans to proceed with such trials but the following strategy seems most appropriate at this time: a county wishing to embark on planned change in the manner suggested by the model would establish a formal liaison with the Trent Valley Centre. This might best be done by appointing one staff member from that county as a project officer of the Trent Valley Centre specifically responsible for change in his county (with office and secretarial assistance in his county) but accountable to the Trent Valley Centre for his activities within that county. Such a person would undergo intensive training from the Centre staff and be heavily supported in his initial work. Such support would be gradually reduced as the project officer acquired the knowledge and skills to become more self-dependent. It is conceivable that after a two to three year apprenticeship period the project officer would need only consultative assistance from the central Centre staff and the county's change activities would be relatively independent of outside assistance.

The most appropriate type of candidate for the project officer role seems, at this time, to be a vice-principal, principal or resource teacher with an M.Ed. or working toward that degree, able to relate well to other principals and teachers.

The second type of activity, in addition to such liaison, required to further refine the school change model is more formal hypothesis testing related to the relationship existing in the cells of the model shown in Part I, Figure 1. The information gathered about specific cells in the model is the most important reason for counties who have implemented the model to retain an association with the Trent Valley Centre. Not only will the information be useful to them but their cooperation is essential to the gathering of such information.

Some major questions in need of investigation about each of the cells concern:

1. Which of the cells are empty? From present perspectives more cells seem to be full than empty and many can be readily identified;
2. What is the degree of importance of each of the full cells to the successful operation of the total model? Obviously, both cells 11 and 21 in Figure 1, for example, are important but it is not presently clear if one is more critical than the other;
3. What are the unique characteristics of the 7 components as they operate within any of the 7 stages. Evaluation, for example, in cell 13 is very different in nature than evaluation in cell 53, being very subjective and broad in the first case and possibly quite specific and objective in the latter. Similarly, the establishment of a climate for change in stages 1, 2 and 3 (cells 11, 21 and 31) is at present a task about which little is known and which may be approached from several points of view. OISE sociologists M. Fullan, G. Eastabrook and Peggy Hewson have begun to study school characteristics

with a view to modifying dimensions apparently detrimental to planned change. It might also be possible, however, to bring about a climate for change, insofar as the human components of the system are concerned, by employing principles of conflict psychology - optomizing awareness of available alternatives and stimulating curiosity and drive to a level which results in appropriate action to change on the part of school staffs.

Many approaches to answering the questions raised by the model are possible, some, like, the above example, involving basic research activities before adequate information is acquired.

4. Are the present components and stages articulated in the model appropriate? Do others need to be added or some of the present ones deleted?

Answering these questions, in a way that contributes directly to efficient school change, particularly in its home region, is the basic task the Trent Valley Centre has set for itself for the foreseeable future.

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